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MEDICINAL PLANT DIVERSITY IN THE TESSO NILO NATIONAL PARK, RIAU, SUMATRA, INDONESIA*

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ABSTRACT

SUSIARTI, S., PURWANTO, Y. & WALUJO, E.B. 2009. Medicinal plant diversity in the Tesso Nilo National Park, Riau, Sumatra, Indonesia. *Reinwardtia* 12(5): 383–390**.** — A study of traditional knowledge on plant uses especially medicinal plants of the local community, was conducted in 2003 at the Situgal Village and its surrounding area in the Tesso Nilo National Park at the Logas Tanah Darat District, Riau Province, Sumatra, Indonesia. Research methods included open-ended discussion and direct observation. To better assess the extractive activities and the utilization of the plant diversity by the local people, an index of cultural significance (ICS) analysis was employed. Research results showed that local people in Situgal still use a large number of plants for medicinal purposes and rely on ethnobotanical knowledge in their daily life. We recorded 86 species belonging to 78 genera and 46 families of plants having ethnobotanical values. Eighty-two species are used for medicinal purposes and the remaining 4 species for fish poisons. Those species can be used to cure approximately 38 types of illness. The ICS analysis for the potential value of each species showed that '*patalo bumi*' (*Eurycoma longifolia*) is the most important species and well utilized by local community in the Tesso Nilo NP area.

Key words: Medicinal plants, poisonous plants, Tesso Nilo National Park, Riau Province, Sumatra, Indonesia

ABSTRAK

SUSIARTI, S., PURWANTO, Y. & WALUJO, E.B. 2009. Keanekaragaman tumbuhan obat di Taman Nasioanl Tesso Nilo, Riau, Sumatera, Indonesia. *Reinwardtia* 12(5): 383–390**.** — Penelitian pengetahuan masyarakat pada pemanfaatan tanaman khususnya tumbuhan obat masyarakat setempat telah dilakukan pada tahun 2003, di desa Situgal dan sekitar Taman Nasional Tesso Nilo di Kabupaten Logas, Provinsi Riau, Sumatra, Indonesia. Metoda penelitian dilakukan secara wawancara terbuka dan pengamatan langsung kemudian di analisis dengan ICS (*index cultural significance*). Hasil penelitian menunjukkan bahwa masyarakat lokal di Situgal memanfaatkan tumbuhan obat dalam kehidupan sehari-harinya, tidak kurang dari 86 jenis tumbuhan yang tergolong dalam 78 marga dan 46 famili. Tercatat 82 jenis yang dimanfaatkan untuk tumbuhan obat dan 4 jenis lainnya untuk racun ikan. Jenis-jenis ini dapat mengobati sekitar 38 macam penyakit. Hasil analisis ICS menunjukkan bahwa *patalo bumi* (*Eurycoma longifolia*) merupakan jenis yang terpenting dan banyak dimanfaatkan oleh masyarakat lokal.

Kata kunci: Tumbuhan obat, Tumbuhan racun, Taman Nasional Tesso Nilo, Propinsi Riau, Sumatra, Indonesia

INTRODUCTION

Indonesia is rich in useful plants, where old records (Heyne, 1950) have shown that there are about 5000 species, constituting 17% of the total number of species in the country and the medicinal plants accounts only for 3% (Kartawinata, 2004). Undoubtedly the total number today is greater than these figures considering that extensive plant exploration and ethnobotanical recording have been undertaken, but to date the results have not been summarized. Recent initiatives to document the Indonesian medicinal plants have been undertaken *e.g.* Djumidi *et al.,* (1997, 1999) and Hutapea *et al.* (1993, 1994) and a more detailed monograph and description has been initiated (Kardono *et al.,* 2003). In developing countries up to 80 % of the population depend on traditional plant-based medicine (Farnsworth *et al.,* 1985), which likely holds true for Indonesia also.

Sumatra is the sixth largest island in the world, with a total area of about 476,000 km², approximately 1800 km long, and 400 km wide. The island contains more than 10,000 plant species: the majority of which are found in lowland forest. Sumatra is well known as an island with high diversity of habitats. However, in recent years, ecological degradation, population pressure, and an increase in industrial tree and oil-palm plantations, have had an impact on the environment. Land use changes, including logging, based solely on political and economic considerations have led to the neglect of important ecological realities. The idea of logging moratorium has been raised by many parties as an important opportunity to save Sumatra's natural resources, particularly its lowland forests which are under serious threats. About 50% of forest degradation occurs in lowland forests, the habitat of 60% of tropical forest species and based on recent data, Sumatra has lost almost 75% of its lowland forests by 1997 (BAPPENAS, 2003).

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Appreciating the potential pharmaceutical value of forest plants underlines the need to value forest ecosystems, implying the need of conserving forest ecosystems, in view of the fact that the nature of species in an ecosystem, including their pharmaceutical and chemical characteristics, is a products of interactions between species and environmental factors within ecosystems. It is feared, and in fact a reality, that currently forest ecosystem integrity is threatened by destruction resulting in the degradation of the quality of plant resources and their environment. This negative impact is particularly true also for the Tesso Nilo National Park area. Prior to our study, no ethnobotanical inventory had been conducted (Gillison, 2001), however, the vegetation survey and habitat assessments of the area have been carried out. Given these circumstances, our study focuses on the ethnobotany of medicinal and poisonous plants. This report is expected to contribute to the conservation of indigenous knowledge of the local people who have explored the resources in their surrounding areas.

STUDY SITE

The study was conducted in the Situgal village in the Logas Tanah Darat sub-district, Kuantan Singingi (Kuansing) district, Riau province, Indonesia. In the vicinity of the Tesso Nilo National Park. The Park has a total area of 188,000 ha and lies between latitude 0° 0'5.1" – 0° 14'56"S and longitude 101° 31'14.6" – 101° 52'1.9"E. It covers four districts of Indragiri Hulu, Kuantan Singingi, Pelalawan, and Kampar, within Riau Province. It was originally designated as a production forest, but it was later legislated as a National Park in August 2004. The Tesso Nilo National Park is bordered by Kerumutan Wildlife Game Park to the east, Bukit. Rimbang Nature Reserve (west), Bukit Tiga Puluh National Park (southeast), and Kerinci Seblat National Park (south).

Western part of Tesso Nilo consists of about 37,000 ha of conversion forest leased by several companies to be converted to timber and rubber estates. Moreover, the central section of Tesso Nilo about 120,000 ha, is a limited production forest leased by three companies for selective logging. The eastern part of Tesso Nilo, about 35,000 ha, is production forest leased by Inhutani for rehabilitation. The eastern plains of central Sumatra can be classed as super humid with annual rainfall ranging from 2000–3000 mm (Gillison, 2001).

The Situgal village is inhabited by 51 families (216 person), consisting of several ethnic groups, namely Melayu, Kampung Selapan, Piliang, and Mandailing. The major livelihood of the local people is tapping rubber and farming. All the ethnic groups speak a common Melayu language, including common plant names.

METHODS

The ethnobotanical study was conducted during 3–17 June 2003, with a focus on local traditional knowledge of the communities in Tesso Nilo about their plant resources, especially medicinal and poisonous plants. We chose Situgal village as a representative research site. Our method included open-ended discussions and direct observation in the field, with 22 respondents and five of them were women. Fifty percents of the respondents were local people of 40 – 60 years old and others were younger people.

Several questions concerning medicinal and poisonous plants were addressed concerning information on the vernacular names of plants, localities where they were collected, parts of plants used and how they are used. The respondents joined us to the fields where the plants were collected in the Situgal village (Site A) and the forest (Sites B, C, and D). Herbarium specimens were collected in the field, then identified in Herbarium Bogoriense, Botany Division, Research Center for Biology – LIPI.

Similar to other local societies in Indonesia, the Situgal community's knowledge of plant diversity in their area is primarily based on the plant' morphological characteristics and usefulness. Situgal community folk taxonomy uses plant habitat, the color of different plant parts and wood and bark texture to distinguish between plant taxa.

We used the following identification criteria in our interviews with community members: (1) listing the morphological characteristics of each plant. This step is usually performed by looking at leaf (*daun*) shape, tree (*batang kayu*), root (*ureik*), fruit (*buah*), twigs (*dahan*), liana (*aka*), rhizome (*isi*), stem pith (*umbuik*), (2) group similar plant growth forms, *i.e.*, grasses (*rumpuik*), rattans (*rotan*), ferns (*paku*), mosses (*lumuik*), fungi (*tenawan*), epiphytes (*sakek*); (3) confirming local plant names; and (4) listing plant uses.

In order to better quantify the extractive activities and the utilization of plant diversity by the local people, we employed the index of cultural significance (ICS) analysis developed by Turner (1988). The objective of our analysis was to rank a subset of useful plants, which have a significant value in local people's daily lives.

ICS analysis provides a series of significance values for useful plants in a given society. The ICS is determined for each plant species separately.

The formula is :

$$ICS = \sum_{I=1}^{n} (q \times i \times e)_{ni}$$

We employed a second formula in connection with each plant species that has several medicinal and poisonous uses:

$$ICS = \sum_{I=1}^{n} (q_1 \times i_1 \times e_1)_{n1} + (q_2 \times i_2 \times e_2)_{n2} + \ldots\ldots + (q_n \times i_n \times e_n)n_n$$

Notes:

$n_{1......}n_n$ = the total number of uses for each species.

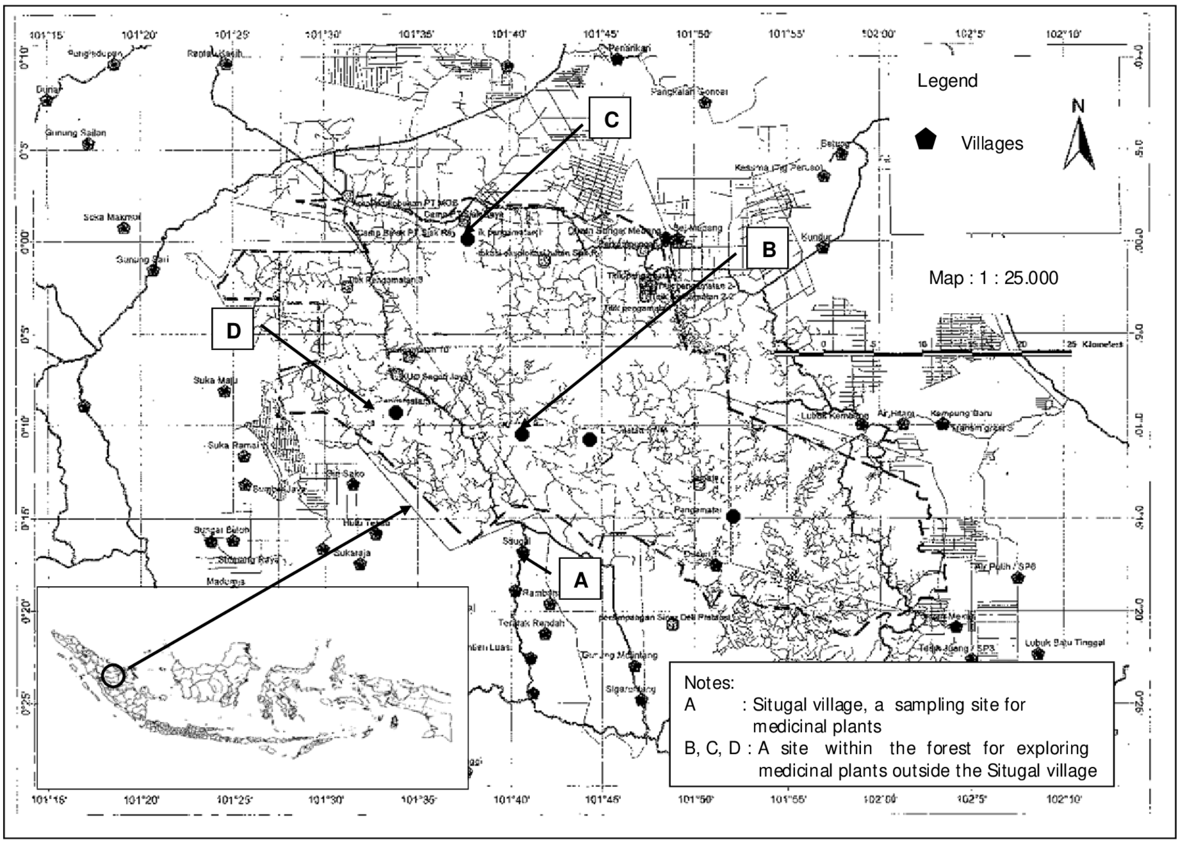
$q_{1.......}q_n$ = score or value to the quality of the plant species. For primary food the score is 5; secondary food is 4; other food, secondary material, or medicine is 3; ritual use is 2; mere recognition is 1**.**

$i_{1.......}i_n$ = score of intensity use of each plant species. The intensity score as follows: very high = 5; moderately high = 4; medium use = 3; low use = 2; and minimal use = 1.

$e_1\ldots..e_n$ = score of exclusivity value. The exclusivity value for preferred choice = 2, one of several or many possible sources = 1; and secondary source = 0.5.

STUDY SITES (A, B, C, D) AT THE TESSO NILO AREA

Location Map of Tesso Nilo



Notes:
A : Situgal village, a sampling site for medicinal plants
B, C, D : A site within the forest for exploring medicinal plants outside the Situgal village

RESULTS

Based on the interviews we recorded 88 species recognized by the community, belonging to 81 genera, and 49 families (Table 1). Eighty-three species are medicinal herbs and the remaining four species are fish poison. These plants are used for medicinal purposes and as poisons to treat approximately 38 types of disease. Most of the species are wild plants. Several of them are cultivated and have dual functions as spice plants, such as: *Alpinia galanga, Curcuma longa*, and *Zingiber officinale*; or as ornamental plants, such as *Allamanda cathartica, Graptophyllum pictum*, and *Kalanchoe pinnata.* The poisonous plants are *Derris elliptica*, *Calophyllum soulattri, Diospyros siamang* and *Styrax benzoin.* They are used as fish poison, hence have been domesticated.

The plants occur in the home gardens surrounding the houses, secondary forests, primary forests, and in other cultivated areas. The genera we encountered most frequently in our research pertained to the families *Zingiberaceae* (9 species) and *Poaceae* (5 species). These species tend to be found most frequently in cultivated areas with significant human influence, such as secondary forests, gardens, and open fallowed areas.

The product of potential value analysis for each species based on local people's knowledge by using ICS (Table 1) shows that *Eurycoma longifolia* (ICS= 43) is the most important species and well known in the community. *Eurycoma longifolia* is mainly used as a tonic medicine as indicated by the highest frequency of use by the local people. The next most frequent use is as medicine to treat fever, stomachache, and as an appetite stimulant.

Table 1. Index of cultural significance of medicinal and poisonous plants in Tesso Nilo National Park

No		Scientific name		Details of calculations	ICS
	Local name	**Species**	**Family**		
1	Patalo bumi	*Eurycoma longifolia*	*Simar.*	(3x4x2) + (3x3x1) + (3x2x1) + (3x2x1)	43
2	Kunyit bolai	*Zingiber purpureum*	*Zingi.*	(3x4x1) + (3x4x2)	36
3	Jarangau	*Acorus calamus*	*Arace.*	(3x4x1) + (3x4x2)	36
4	Kelimidei	*Bridelia tomentosa*	*Eupho.*	(3x4x1) + (3x3x1)	21
5	Duri bariang	*Canthium horridum*	*Rubia.*	(3x4x1) + (3x3x1)	21
6	Sirih	*Piper betle*	*Piper.*	(3x3x1) + (3x2x1) + (3x2x1)	21
7	Kelapa	*Cocos nucifera*	*Areca.*	(3x3x1) + (3x2x1) + (3x2x1)	21
8	Rambutan	*Nephelium lappaceum*	*Sapin.*	(3x3x1) + (3x3x1)	18
9	Sugi-sugi	*Gendarussa vulgaris*	*Acant.*	(3x3x1) + (3x3x1)	18
10	Rosam	*Dicranopteris linearis*	*Gleic.*	(3x3x1) + (3x3x1)	18
11	Durian	*Durio zibethinus*	*Bomba.*	(3x3x1) + (3x3x1)	18
12	Kunyit	*Curcuma longa*	*Zingi.*	(3x3x1) + (3x3x1)	18
13	Padi penawar	*Oryza sativa*	*Poace.*	(3x3x1) + (3x3x1)	18
14	Lemo hutan	*Scleropyrum wallichianum*	*Santa.*	(3x3x2)	18
15	Aka barabuni	*Phytocrene macrophylla*	*Icaci.*	(3x3x1) + (3x3x1)	18
16	Aka semolik	*Spatholobus gyrocarpus*	*Fabac.*	(3x3x1) + (3x3x1)	18
17	Sepodeh	*Zingiber officinale*	*Zingi.*	(3x3x1) + (3x3x1)	18
18	Bira'	*Colocasia cf esculenta*	*Arace.*	(3x3x1) + (3x3x1)	18
19	Terung asam	*Solanum quitonse*	*Solan.*	(3x3x1) + (3x3x1)	18
20	Aka lemponang	*Stephania japonica*	*Menis.*	(3x3x2)	18
21	Tubo ureik	*Derris elliptica*	*Fabac.*	(3x3x2)	18
22	Lengkuas putih	*Alpinia galanga*	*Zingi.*	(3x3x1) + (3x2x1)	15
23	Pisang batu	*Musa paradisiaca*	*Musac.*	(3x2x1) + (3x3x1)	15
24	Pinang	*Areca catechu*	*Areca.*	(3x2x1) + (3x3x1)	15
25	Aka barabuni	*Nothocissus spicifera*	*Vitac.*	(3x3x1) + (3x2x1)	15
26	Capo	*Blumea balsamifera*	*Aster.*	(3x2x1) + (3x3x1)	15
27	Modang kalimanyoh	*Cinnamomum javanicum*	*Laura.*	(3x3x1) + (3x2x1)	15
28	Aka bulu	*Argyreia capitata*	*Convo.*	(3x4x1)	12
29	Aka mati usuk	*Spatholobus maingayi*	*Fabac.*	(3x4x1)	12
30	Pua kijang	*Etlingera* sp.	*Zingi.*	(3x4x1)	12
31	Pelasan	*Vitex laevifolium*	*Verbe.*	(3x3x1)	9
32	Pelasan	*Syzygium antisepticum*	*Myrta.*	(3x3x1)	9
33	Puding hitam	*Graptophyllum pictum*	*Acant.*	(3x3x1)	9
34	Sedingin	*Kalanchoe pinnata*	*Crass.*	(3x3x1)	9
35	Setawar	*Costus speciosus*	*Zingi.*	(3x3x1)	9

36	Sekumpai	*Hymenachne interrupta*	*Poace.*	(3x3x1)	9
37	Gelenggang	*Senna alata*	*Fabac.*	(3x3x1)	9
38	Juang-juang	*Labisia pumila*	*Myrsi.*	(3x3x1)	9
39	Selasih rimbo	*Chassallia curviflora*	*Rubia.*	(3x3x1)	9
40	Kayu kijang	*Tarenna* sp.	*Rubia.*	(3x3x1)	9
41	Sakek dukung2	*Dischidia punctata*	*Ascle.*	(3x3x1)	9
42	Pegago	*Centella asiatica*	*Umbel.*	(3x3x1)	9
43	Pucuk babi	*Adenostemma parviflorum*	*Aster.*	(3x3x1)	9
44	Ilalang	*Imperata cylindrica*	*Poace.*	(3x3x1)	9
45	Peladang	*Plectranthus scutellaroides*	*Lamia.*	(3x3x1)	9
46	Terkilir	*Sida rhombifolia*	*Malva.*	(3x3x1)	9
47	Cokuah	*Kampferia galanga*	*Zingi.*	(3x3x1)	9
48	Buluh soni	*Schizostachyum* sp.	*Poace.*	(3x3x1)	9
49	Lakun	*Pterisanthes cissoides*	*Vitac.*	(3x3x1)	9
50	Kunyit temu	*Curcuma xanthorriza*	*Zingi.*	(3x3x1)	9
51	Lemo kapas	*Citrus aurantifolia*	*Rutac.*	(3x3x1)	9
52	Bawang merah	*Allium sativum*	*Lilia.*	(3x3x1)	9
53	Putat	*Barringtonia macrostachya*	*Lecyt.*	(3x3x1)	9
54	Mampat	*Gnetum cuspidatum*	*Gneta.*	(3x3x1)	9
55	Tungkat tulang bubung	*Aglaia silvestris*	*Melia.*	(3x3x1)	9
56	Mempuyan	*Pternandra coerulescens*	*Melas.*	(3x3x1)	9
57	Kangkung	*Ipomoea aquatica*	*Convo.*	(3x3x1)	9
58	Pucuk katuk	*Sauropus androgynus*	*Eupho.*	(3x3x1)	9
59	Ubi	*Manihot utilissima*	*Eupho.*	(3x3x1)	9
60	Sawi	*Brassica juncea*	*Brasi.*	(3x3x1)	9
61	Lobak	*Raphanus sativus*	*Brasi.*	(3x3x1)	9
62	Papaya	*Carica papaya*	*Caric.*	(3x3x1)	9
63	Bawi'	*Calophyllum soulattri*	*Clusi.*	(3x3x1)	9
64	Akar kayu kuning	*Lepionurus sylvestris*	*Opili.*	(3x3x1)	9
65	Tobu sira	*Saccharum officinale*	*Poace.*	(3x2x1)	6
66	Terap	*Artocarpus elasticus*	*Morac.*	(3x2x1)	6
67	Terentang	*Campnosperma auriculatum*	*Anaca.*	(3x2x1)	6
68	Kapuk	*Ceiba pentandra*	*Bomba.*	(3x2x1)	6
69	Bunga cino	*Allamanda cathartica*	*Apocy.*	(3x2x1)	6
70		*Gynura procumbens*	*Aster.*	(3x2x1)	6
71	Terung	*Solanum melongena*	*Solan.*	(3x2x1)	6
72	Perio	*Momordica charantia*	*Cucur.*	(3x2x1)	6
73	Patulo	*Luffa acutangula*	*Cucur.*	(3x2x1)	6
74	Narung lolek	*Trema orientalis*	*Ulmac.*	(3x2x1)	6
75	Terung pipit	*Solanum torvum*	*Solan.*	(3x2x1)	6
76	Boutik	*Cucumis sativus*	*Cucur.*	(3x2x1)	6
77	Tungkal	*Diospyros maingayi*	*Ebena.*	(3x2x1)	6
78	Koang-koang	*Dialium indum*	*Fabac.*	(3x2x1)	6
79	Aka sekapoah	*Zizyphus calophylla*	*Rhamn.*	(3x2x1)	6
80	Topek lembiek	*Pimeleodendron griffithianum*	*Eupho.*	(3x2x1)	6
81	Sundak langit	*Amorphophallus* sp.	*Arace.*	(3x2x1)	6
82	Tontam	*Diospyros hermaphroditica*	*Ebena.*	(3x2x1)	6
83	Narahan	*Knema latericia*	*Myris.*	(3x2x1)	6
84	Buah usai	*Plagiostachys albiflora*	*Zingi.*	(3x2x1)	6
85	Keji beling	*Clerodendrum serratum*	*Verbe.*	(3x2x1)	6
86	Sanguik	*Diospyros siamang*	*Ebena.*	(3x2x1)	6
87	Lopoek	*Styrax benzoin*	*Styra.*	(3x2x1)	6
88		*Trichosanthes bornensis*	*Cucur.*	(3x2x1)	6

Meanwhile, both *Zingiber purpureum* and *Acorus calamus* both have ICS = 36. It means that both are well known and mostly used by the local people in Situgal. Three species which have ICS = 21 are *Bridelia tomentosa, Canthium horridum, Piper betle,* and *Cocos nucifera*. *Bridelia tomentosa* and *Canthium horridum* are recognized as headache and fever medicine. *Piper betle* is useful as a compound in making cough, back-ache and tooth-ache medicine. Lastly, *Cocos nucifera* is processed to make coconut oil, not directly as a raw material to make medicine. ICS 18 belongs to *Scleropyrum wallichianum, Stephania cf. japonica, Derris elliptica*. Most people in Situgal recognize *Stephania cf japonica* as a medicine, *Derris elliptica* as a fish poison, while *Scleropyrum wallichianum* is popular for ritual use. The remaining species have varying potential values; ICS = 15:6 species; ICS = 12:3 species; ICS = 9:34 and ICS = 6:23 species.

The number of plant species and their utilization for healing diseases are shown on Table 2. The highest number of plant species (15), which are employed as medicinal plants, are primarily used for healing two kinds of diseases (fever, malaria), followed by headache (14) and backache (14).

The application of medicinal and poisonous plants, as well as other types of plant use in the community is as follows:

Tonic medicines.

The local people usually use *patalo bumi* (*Eurycoma longifolia*) as a tonic medicine. Roots are boiled than drunk, and sometimes decoction of roots mixed with alcohol and a deer fetus. This mixture is used as a tonic medicine for both men or women.

Table 2**.** Number of species associated with each kind of disease

No.	Kind of diseases	No. species
1	Fever, malaria	15
2	Headache	14
3	Backache	14
4	Stomachache, diarrhea, problem of stomach	12
5	Ashmatic, liver	9
6	Skin infection	8
7	Cough	6
8	Muscular aches	6
9	Lactation	5
10	Miscellaneous	5
11	Eye, ear & tooth infections	4
12	Health care	3
13	Post pregnancy	3
14	Hair treatment	3
15	Tonic	1
16	Swollen neck	1
17	Vomiting	1
18	Aphrodisiac	1
19	Venereal diseases	1
20	Sedative	1
21	Animal diseases	1

Fever and malaria medicine.

a. Aka bulu (*Argyreia capitata*). The leaves are crushed and put into water, then applied to the body.

b. *Kalimidei* (*Bridelia tomentosa*). The leaves are mixed with *aka bulu* leaves then pounded, pressed and added to water. Later the mixture is placed on the tongue and the rest is mixed and applied to the body.

c. *Patalo bumi* (*Eurycoma longifolia*). Roots are boiled then drunk.

d. *Rosam* (*Dicranopteris linearis*). The leaves are mixed together with leaves of *rambutan* (*Nephelium lappaceum*) and *durian* (*Durio zibethinus*), crushed and added to water. Later the mixture is placed on the tongue 3 times, then lifted with the left hand, and blown 3 times over the top of the head and applied to the body.

e. *Bira'* (*Colocasia cf esculenta*), mixed with the stem and fruit of *terung asam* (*Solanum quitonse*), and the leaves of *lakun* (*Pterisanthes cissoides*). Everything is crushed and added to water, later applied to the body. If it does not itch, it means that it is right for the condition or vice versa.

f. *Duri bariang* (*Canthium horridum*), add leaves to water, then crushed and place 3 drops on the tongue. Later the remainder is applied to the body.

g. *Tobu sira* (*Saccharum officinarum*), mixed with the pith of the young stem with leaves of *aka bulu* (*Argyreia capitata*), then crushed and added to water then applied to the body.

h. *Sugi-sugi* (*Gendarussa vulgaris*), *sedingin* (*Kalanchoe pinnata*), *setawar* (*Costus speciosus*), *sekumpai* (*Hymenachne interrupta*) and *cemoteh,* are mixed, crushed and then applied to the body.

Cough medicine.

a. *Padi penawar* (*Oryza sativa*), is first pounded into flour then mixed with coconut water and honey and drunk.

b. *Aka barabuni* (*Nothocissus spicifera*), the stem is pounded and added to water, crushed then drunk.

c. *Aka barabuni* (*Phytocrene macrophylla*), the roots are boiled and drunk. Other methods, include mixing the roots with the leaves of betle, the fruit of pinang and lime as a masticant.

d. *Lemo kapas* (*Citrus aurantifolia*), mixed with fruit juice and salt then drunk.

Backache medicine.

a. *Pelasan* (*Vitex laevifolium*), the leaves are mixed with leaves of *sirih* (*Piper betle*), then chewed and spit on the hip and stomach for *'puasan'* (backache together with stomachache and swelling).

b. *Aka semolik (Spatholobus gyrocarpus),* the stem is roasted and added to warm water then drunk for backache.
c. *Terung* (*Solanum melongena*), mix the leaves with leaves of *perio* (*Momordica charantia*), *aka barabuni* (*Phytocrene macrophylla*), *tuklotuik, patulo* (*Luffa acutangula*), *lopang, narung lolek* (*Trema orientalis*), *terung pipit* (*Solanum torvum*), *boutik* (*Cucumis sativus*) and the stem of *aka semolik* (*Spatholobus gyrocarpus*)*,* and then pounded then added to warm water. It is wrapped in cloth then spread on the mid section for kidneys medicine (used in the night and replaced in the morning, tried up to 3 times a day). We recorded *tuklotuik* and *lopang* only from interviews without any voucher specimens to corroborate.
d. *Aka sekapoah* (*Zizyphus calophylla*), pound the leaves and mix with coconut milk, then heated and used as a poultice.

Several plants are also used as fish poison by the local people, such as:
a. Bark of bawi' (*Calophyllum soulattri*)
b. Bark of lopoek (*Styrax benzoin*)
c. Bark of sanguik (*Diospyros siamang*)
d. Roots of tubo ureik (*Derris elliptica*). Tubo ureik consist of 3 kinds: (1) tubo manggis; (2) tubo kapur (3) tubo kayu aro.

DISCUSSION

Knowledge of Diverse Uses of Medicinal and Poisonous Plants

The local people in Situgal recognize many medicinal and poisonous plants, and they know how to use them. This knowledge is linked to their culture and their beliefs. Their knowledge system includes local perceptions, concepts, and strategies expressed through culturally specific ethics, norms, rules, and skills which they use to meet life's challenges. Frequently local perceptions of plants are based not only on the physical plant characters, but also based on the plants' usefulness for food, tools and medicine.

In connection with medicinal and poisonous plants, the results of this study show that local people in Situgal still use, a variety of plants for traditional healing. They also employ their plant knowledge in their daily life activities. Despite the availability of alternative pharmaceuticals, limited economic development in the area left the villagers to continue relying on traditional medicine prepared from local plants. Villagers use of modern or traditional medicine is related to the availability of information and certain communication channels. In recent years, to heal internal problems, villagers will bring patients to local hospitals. However, to treat skin diseases, wounds, diarrhoea, fever, backache and other conditions, they still use medicinal plants. There are strong reasons why they still employ traditional healing methods. Their use of local plants is connected with their daily activities, such as hunting and collecting plants, which increase their familiarity with useful plants. They fully understand the potentials of plants either as edible plants or medicinal plants.

In comparison to a previous study (Susiarti, 1992) in Kayan Mentarang National Park, the total number of medicinal and poisonous plants documented in Tesso Nilo is less than in Kayan Mentarang NP. We believe this difference is due to differences in the number of respondents involved in the study, and the area covered by the research. In contrast, the kinds of plants that are recognized and used by the local people in Tesso Nilo are almost the same as those recognized by Minangkabau communities around Lembah Harau Nature Reserve, West Sumatera (Susiarti, 2001) and Bukit Tiga Puluh National Park in Riau (Rahayu *et al*., 2000). There are 23 plant species common on both Tesso Nilo and the Minangkabau such as: *Acorus calamus, Cinnamomum javanicum, Derris elliptica, Graptophyllum pictum, Momordica charantia,* and *Zingiber purpureum.* Furthermore, 19 species out of 86 plants are common to both Bukit Tiga Puluh NP and Tesso Nilo. These species include *Costus spesiosus, Eurycoma longifolia. Kalanchoe pinnata, Nephelium lappaceum* and *Pterisanthes cissoides.*

Bawi' (*Calophyllum soulattri*), as indicated above is used as a fish poison. It is a relative of *Calophyllum lanigerum* and *C. teysmannii.* The latter two species contain compounds that have been identified as raw materials of calanolide A and B which are useful as anti HIV medicines. (Kardono, 2001).

The species encountered during the fieldwork have been used and listed in the Indonesian medicinal plants such as *Acorus calamus, Ceiba pentandra, Curcuma xanthorriza, Dialium indum, Durio zibethinus, Kalanchoe pinnata, Manihot utilissima, Raphanus sativus,* and *Trema orientalis* (Syamsuhidayat & Hutapea, 1991; Hutapea, 1993; Hutapea *et al.,* 1994; Djumidi *et al*., 1997; Djumidi *et al.*, 1999). However, other species we recorded have not been listed in the inventory of Indonesian medicinal plants, but have reported as medicinal plants elsewhere in Southeast Asia. (Jansen *et al.*, 1993), such as *Aglaia silvestris, Bridelia tomentosa, Chassallia curviflora, Gnetum cuspidatum, Lepionurus sylvestris,* and *Pte-*

risanthes cissoides.

Knowledge of healing

In the study of traditional medicine, symptoms and kinds of disease can not be learned individually. To avoid the wrong interpretation of the information given by respondents, observation of the body functions, concept of health and illness are very important. We emphasize this point to help lessen researcher error in interpreting the information provided by community members. Based on our investigation, most of the local people in Situgal, have explicit knowledge regarding certain body functions, and have broad knowledge pertaining to different body parts, but they do not know the specific function of each part of the body. They only recognize external parts, but rarely have a complete understanding of each organ's function.

They know that each part of the body forms a unity, and can not be separated from each other. If one part has a problem, it will impact on other body functions. However, the local people do not always say 'sick', if only one body part has a problem.

Situgal people believe that someone is 'sick' if they can not perform their daily activities. On the other hand, the definition of healthy by the local people means they are able to complete their work. The definition of illness relates to the overall well being of the community-symbolically-that the crops grow well, the land is fertile, and no disasters occur. All this relates to the concept of harmony with their environment.

Esram (1996), reported that the definition of illness is translated as a condition of imbalance, either for people or their surrounding area. Based on that definition when someone is sick, it means he is out of balance with his surroundings or his body does not function as it should.

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